

REMARKS

Claims 66-67, 69-70, 72-73, 75-76, 78-79, 81-85 and 87-90 are in the application. Claims 68, 71, 74, 77, 80 and 86 are canceled herein.

I. Response to Objections and Rejections of Claims 68, 71, 74, 77, 80 and 86

In part 2 of the Office Action, the Examiner objects to the Specification for introducing new matter regarding determining a process endpoint via claims 68, 71, 74, 77, 80 and 86. In part 3 of the Office Action, the Examiner rejects the same claims under 35 USC §112, first paragraph, for containing subject matter not described in the Specification. In part 7 of the Office Action, the Examiner rejects the same claims under 35 USC §103(a) for obviousness. Applicants submit that cancellation of claims 68, 71, 74, 77, 80 and 86 renders these objections and rejections moot.

II. Response to Objection Under 37 CFR 1.75(c)

In part 4 of the Office Action, the Examiner objects to claim 73 for improper dependency. Accordingly, claim 73 has been amended for proper dependence from claim 72.

III. Response to Remaining Rejections Under 35 USC §103(a)

A. Background

At issue are claims 66-67, 69-70, 72-73, 75-76, 78-79, 81-85 and 87-90, which stand rejected under 35 USC §103(a) for obviousness over Muraoka et al. (JP-411220004A) (“Muraoka”) in view of Cabib et al. (US 5,856,871) and the Finland (“ImSpector”) references of record. The Examiner cites to Muraoka for its teachings related to CVD processing, and to Cabib et al. and Finland et al. for their teachings related to imaging spectrometers. According to the Examiner, it would have been obvious to combine the teachings of these references to achieve the claimed invention.

According to MPEP § 706.02(j), for a claim to be obvious, there must be: (a) a suggestion or motivation to combine reference teachings; (b) a reasonable expectation of success; and (c) the references must teach all of the claim limitations. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). It is well established at law that, for a proper rejection of a claim under 35 U.S.C. §103 as being obvious based upon a combination of references, the cited combination of

references must disclose, teach, or suggest, either implicitly or explicitly, all elements/features/steps of the claim at issue. See, e.g., *In re Dow Chemical*, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988), and *In re Keller*, 208 U.S.P.Q.2d 871, 881 (C.C.P.A. 1981).

B. The cited references do not teach or suggest making thickness measurements during relative motion of the wafer and wafer transfer mechanism, as claimed

All of the claims rejected for obviousness contain a limitation whereby spectral images are obtained while the transfer mechanism moves the wafer. For example, claims 66, 72 and 78 each include an element whereby one-dimensional spectral frames are produced

while said spectral imager and the wafer undergo relative motion provided by said wafer transfer mechanism.

Applicants submit that this limitation is not taught in any of the cited references.

In part 6 of the Office Action, the Examiner asserts that Muraoka teaches “a film thickness measuring section (70) for measuring the thickness of the wafer while the thickness measuring section and the wafer undergo relative motion provided by the wafer transfer mechanism.” However, this interpretation of Muraoka is clearly erroneous.

The Examiner’s interpretation is based solely on an uncertified translation of the Muraoka Abstract, and on inspection of Figures 1, 3, 4 and 5. Without the benefit of a certified translation of the entire Muraoka reference, Applicants respectfully submit that the Examiner’s interpretation is merely an educated guess. Therefore, to facilitate thorough examination, Applicants provide herein a full English translation of the Muraoka reference. See Translator Certification of J. Marchioro for “A Substrate Processing Apparatus” (attached hereto as Exhibit A); and the corresponding English translation of JP-H11220004A to Muraoka (attached hereto as Exhibit B).

After a thorough review of the full translation in Exhibit B, Applicants respectfully submit that, contrary to the Examiner’s interpretation, Muraoka neither teaches nor suggests making thickness measurements “*while the thickness measuring section and the wafer undergo relative motion provided by the wafer transfer mechanism.*”

With reference to Exhibit B, the Abstract of Muraoka makes a very general statement that film thickness measurements “are measured by the measuring part 70 in the process of the transfer of the substrate 9 on the inside of the transfer part 60.” Thus, it is not clear from the Abstract alone whether (1) Muraoka describes taking measurements while the wafer is in motion, or (2) whether Muraoka describes taking measurements on a stationary wafer at some point in time between wafer transfer steps.

To resolve the ambiguity, we must turn to the translated Muraoka specification. The specification makes it clear that choice (2) is correct, i.e. that Muraoka describes taking measurements on a stationary wafer at some point in time between wafer transfer steps. There is abundant support for this interpretation throughout the specification. For example, paragraph [0020] specifically states that:

a film thickness measurement part 70 that measures thickness of the film that is formed on the surface of the substrate 9 that is held in place by the transfer robot 61 is further provided in the upper surface of the transfer robot 61.

Paragraph [0030] makes the same statement more clearly:

the measurement tip 71 is installed on the transfer part 60 such that it is positioned on the upper surface of the transfer robot 61, and the thickness of the film of the substrate 9 in a state where it is held in place by the transfer robot 61 is measured.

Paragraph [0045] states that

the position control part 84 ... moves the area sensor 73a to a position where it is possible to capture the image of the prescribed area on the substrate 9.

And, paragraph [0069] states that

the first film thickness measurement part 70a carries out measurements for the unprocessed substrate 9 that it is positioned at the stage immediately after it is removed from the carry-in part 10, and the second film thickness measurement part 70b carries out measurements for the processed substrate 9 that it is positioned at the stage immediately before it is housed in the carry-out part
20.

Clearly, by using the transfer robot 61 to hold substrate 9 in place when taking thickness measurements, Muraoka describes a system that takes measurements on a stationary wafer at a point in time between transfer steps, i.e. after the wafer is picked up at one station and before it is dropped off at another station. Thus, Muraoka's transfer mechanism is used only to transfer a wafer between stations, and to hold the wafer stationary when measurements are taken. Unlike the present invention, Muraoka's transfer mechanism is not used to advantage between successive measurements on single wafer, because the motion of relocating the measurement tip 71 is provided by an external mechanism 75. *See* Muraoka, paragraph [0033]. In a system according to the present invention, a single wafer transfer mechanism advantageously effects both station-to-station movement of a wafer, and relative motion between the wafer and the transfer mechanism to facilitate acquisition of high-speed thickness measurements. *See* Application at p.8, ln.13 to p.9, ln.19.

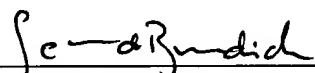
Consequently, Muraoka fails to teach (and also fails to suggest) at least one element common to all of the claims at issue, namely, taking thickness measurements *while said spectral imager and the wafer undergo relative motion provided by said wafer transfer mechanism*. Furthermore, the Cabib et al. and Finland et al. references also fail to teach or suggest this limitation. Therefore, no combination of Muraoka, Cabib et al. and/or Finland et al. disclose, teach, or suggest all elements of the claims at issue. Under prevailing law in the *Dow Chemical* and *In re Keller* cases cited above, Applications submit that the obviousness rejections cannot be sustained and should therefore be withdrawn.

In view of the above, Applicants respectfully request that the Examiner withdraw the obviousness rejections of claims 66-67, 69-70, 72-73, 75-76, 78-79, 81-85 and 87-90 and pass this application to issuance.

In papers submitted concurrently with this Response, Applicants have authorized the USPTO to charge the fee under 37 CFR §1.17(a)(3) for a 3-month extension of time, which is believed to be \$510.00 for a small entity, to our deposit account **08-3038**. Applicants do not believe that any other fees are due for filing this response. If any other fees are due to avoid abandonment of this Application, please charge the same to our deposit account number **08-3038** and make reference to Howrey Docket No. **02578.0006.CPUS01**.

Respectfully submitted,

Date: March 22, 2005


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